Out of the box : moving from categories to dimensions in the phenomenology of depression and anxiety.

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CHAPTER 5

DISTINGUISHING BETWEEN DEPRESSION AND ANXIETY: A PROPOSAL FOR AN EXTENSION OF THE TRIPARTITE MODEL

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Abstract

Aim

The aim of the current study was to develop scales that assess symptoms of depression and anxiety and can adequately differentiate between depression and anxiety disorders, and also can distinguish within anxiety disorders. As point of departure, we used the tripartite model of Clark and Watson which discerns three dimensions: negative affect, positive affect and physiological hyperarousal.

Methods

Analyses were performed on the data of 1449 patients, who completed the Mood and Anxiety Symptom Questionnaire (MASQ) and the Brief Symptom Inventory (BSI). From this, 1434 patients were assessed with a standardized diagnostic interview.

Results

A model with five dimensions was found: depressed mood, lack of positive affect, somatic arousal, phobic fear and hostility. The scales appear capable to differentiate between patients with a mood and with an anxiety disorder. Within the anxiety disorders, somatic arousal was specific for patients with panic disorder. Phobic fear was associated with panic disorder, simple phobia and social anxiety disorder, but not with generalized anxiety disorder.

Conclusions

We present a five factor model as an extension of the tripartite model. Through the addition of phobic fear, anxiety is better represented than in the tripartite model. The new scales are capable to accurately differentiate between depression and anxiety disorders, as well as between several anxiety disorders.

5.1 Introduction

Anxiety and depression are highly associated. High comorbidity is repeatedly found between mood disorders and anxiety disorders (e.g. De Graaf et al., 2002; Kessler, Chiu, Demler, & Walters, 2005; Mineka et al., 1998). Some argue that both disorders are best understood as subtypes of a general neurotic syndrome (e.g. Andrews, 1996). In the most widely used diagnostic system, the DSM-IV (American Psychiatric Association, 1994), however, anxiety and depression are conceptualized as diagnostically distinct disorders. Either way, methods are needed that can adequately differentiate between depression and anxiety, in order to effectively study their relation and their (shared or distinct) etiological factors.

An important contribution to the field was made by Clark and Watson who introduced the tripartite model to assess distinctive and overlapping features of mood disorders and anxiety (1991). To make a model that is able to differentiate between patients with a depression and patients with an anxiety disorder, they took the basic dimensions of affect, *negative affect* and *positive affect,* and added a third factor *physiological hyperarousal*. Thus, their model comprises three dimensions to describe the symptomatology of depression and anxiety. *Negative affect* consists of symptoms of general distress and is common to both depression and anxiety disorders. *Positive affect* is referring to enthusiasm, excitement and energy. A low score on this dimension is typical for depression. The third dimension *physiological hyperarousal,* consist of somatic tension and arousal and was presented as specific for anxiety. To operationalize and measure the dimensions of the tripartite model, Watson and Clark developed the Mood & Anxiety Symptom Questionnaire (MASQ, Watson & Clark, 1991).

The tripartite model has inspired a large body of research, but has met some criticism as well. We will review the major points of critique on each of the three factors of the tripartite model and the MASQ. First, there is criticism on the general distress factor: negative affect (NA) comprises a heterogeneous group of symptoms such as anger, fear, and tension. Although it is supposed to be non-specific for depression as well as for anxiety, some symptoms are in fact quite specific for either depression or anxiety disorders. Anger attacks, for instance, are twice as prevalent in depressed patients as in patients with anxiety disorders ((Pasquini, Picardi, Biondi, Gaetano, & Morosini, 2004; Picardi, Morosini, Gaetano, Pasquini, & Biondi, 2004), Gould et al. 1996 in (Shankman & Klein, 2003)). Symptoms like 'felt afraid' and 'felt nervous' on the other hand, seem more specific for anxiety disorders than for depression. Clark and Watson acknowledged the heterogeneity of NA by subdividing the general distress items of the MASQ in three subcategories: General Distress Depression (GDD), General Distress Anxiety (GDA) and General Distress Mixed (GDM). The items were assigned to these subcategories on face value, i.e. on their similarity with DSM-IIIR criteria for either depression or anxiety

disorders. The separateness of these three subscales of NA, however, could not be confirmed with factor analyses: Several studies on the MASQ concluded that a two or three factor model had the best fit (Boschen & Oei, 2006; Buckby et al., 2008; Burns & Eidelson, 1998; De Beurs et al., 2007; Keogh & Reidy, 2000; Watson et al., 1995).

Second, there are criticisms on the scale positive affect (PA), called anhedonic depression (AD) in the MASQ. Although the scale is presented as a single dimension with two endpoints, (a low positive affect endpoint, loss of interest and a high positive affect endpoint, feeling good), the two endpoints appear as separate factors in factor-analysis (Keogh & Reidy, 2000; Watson et al., 1995; Nitschke et al., 2001; De Beurs et al., 2007) suggesting these two endpoints represent different dimensions. Other evidence that 'lack of interest' and 'feeling good' are separate constructs can be found in the research of Tomarken and Dichter (Tomarken, Dichter, Freid, Addington, & Shelton, 2004). They reported medication to have a differential effect on 'lack of interest' and 'feeling good' as measured with the MASQ. Items assessing the low positive affect pole of the anhedonia dimension were more sensitive to earlier/lower dose bupropion SR (sustained-release) treatment, whereas items assessing the high positive affect pole were more sensitive to later/higher dose bupropion SR treatment.

The third factor, physiological hyperarousal, has been criticised as well. Firstly, a high score on the MASQ scale *'anxious arousal'* (AA) seems to be characteristic for panic disorder only and not for all anxiety disorders (e.g.(Mineka et al., 1998; Chorpita, 2002; Joiner et al., 1999)). Somatic signs of anxiety dominate this scale, while other anxiety symptoms are not well represented. In addition, the scale does not distinguish between patients with and without an anxiety disorder (Buckby, Yung, Cosgrave, & Cotton, 2007). It also does not distinguish between patients with anxiety disorder and depression (Boschen & Oei, 2007; De Beurs et al., 2007). Buckby (Buckby et al., 2007) even found significant higher scores for depressed patients over anxious patients on AA.

The possible limitations of the tripartite model have been acknowledged by the original authors. They recommend to view in future research „individual disorders as representing unique *combinations* of different types of symptoms, with each type showing varying degrees of nonspecificity and with no type being entirely unique to any single disorder" (Mineka et al., 1998, p.398). To operationalize this idea, adequate symptom scales must be developed to include the more unique symptoms of specific mood- and anxiety disorders in addition to common symptom scales. In such a dimensional approach to psychopathology, every disorder (and every patient) will have a more or less unique profile. This is a valuable recommendation and underlines the need for scales that can represent more adequately relevant aspects of anxiety.

The aim of the current study was to develop scales that assess symptoms of depression and anxiety and can adequately differentiate between depression and anxiety disorders, and also can distinguish within anxiety disorders. First, we explored the factor structure of the items of the MASQ extended with items of a questionnaire containing many anxiety items. We choose the Brief Symptom Inventory (BSI), because this questionnaire has many anxiety-related items and resembles the MASQ in the construction of the items and time span. We expected to find in addition to the two specific scales of the MASQ (AA and AD) at least one extra scale, based to a large extent on BSI-items, tapping other aspects of anxiety than the AA scale. We expected the set of new scales to cover anxiety more adequately than the tripartite model and to provide profiles specific for depression and each of the anxiety disorders.

To examine the psychometric properties of the scales found with factor-analysis, we addressed the following questions: (a) What is the reliability of the scales based on the found factor structure? (b) Do these scales measure more distinct concepts as compared to the original scales of the MASQ? (c) Do the new scales have good discriminatory validity for depression and anxiety? (d) Are the new scales able to differentiate between specific anxiety disorders? We expected the set of new scales to have a good reliability and better discriminatory validity than the original MASQ scales.

5.2 Materials and methods

Study sample

This study was conducted on data collected through Routine Outcome Monitoring (ROM, (De Beurs et al., 2011)). ROM is a monitoring system for patient care, implemented in the outpatient clinics of Rivierduinen (a large organization for the provision of mental health care in the province of Zuid-Holland, the Netherlands) and the department of psychiatry of the Leiden University Medical Center (LUMC). All patients referred to these clinics for treatment of a mood-, anxiety- or somatoform disorder, have an assessment session with a psychiatric research nurse at the start, during, and at the end of the treatment. During the first session, a standardized diagnostic interview is administered and interviewer and self-reported ratings are determined. The sample consisted of 1479 patients admitted consecutively between January 2002 and March 2005 to the outpatient clinics of the Rivierduinen Psychiatric Hospital (754 in Leiden; 198 in Alphen a/d Rijn, 163 in Leidschendam and 163 in Voorhout) and the psychiatric outpatient department of Leiden University Medical Center (LUMC, n=201).

Measures

Mini International Neuropsychiatric Interview (M.I.N.I.) Plus 5.0.0.-R.

The M.I.N.I. is a short clinical diagnostic interview developed to explore the

presence of current and life-time Axis-I disorders according to the DSM-IV diagnostic criteria (Sheehan et al., 1998). The Dutch translation of the M.I.N.I. Plus 5.0.0-R was used in the present study (Van Vliet et al., 2000). The M.I.N.I.-Plus is an extended version of the original M.I.N.I.. Lecrubier and colleagues (Lecrubier et al., 1997) report sufficient reliability of the M.I.N.I; Inter-rater reliability ranged from k=.88 to 1.00, test-retest reliability ranged from 0.76 to 0.93, validity was demonstrated by sufficient concordance with the Composite International Diagnostic Interview (CIDI, WHO). Psychiatric research nurses who were extensively trained and supervised performed the interviews. All diagnoses reported in this paper were current at the time of investigation.

Mood and Anxiety Symptom Questionnaire (MASQ, (Watson & Clark, 1991)).
The MASQ consists of 90 items, allocated to five subscales: 1) anhedonic depression; 2) anxious arousal; 3) general distress depression; 4) general distress anxiety, and 5) general distress mixed. All items are presented with a five-point rating scale ranging from 1 (not at all) to 5 (very much). We used a Dutch adaptation of the MASQ (De Beurs et al., 2007).

Brief Symptom Inventory (BSI)
The Brief Symptom Inventory (Derogatis & Melisaratos, 1983; De Beurs, 2005) is a shortened version of the Symptom Checklist (SCL-90) (Arrindel & Ettema, 1986; Derogatis et al., 1973), and is used to measure psychological complaints or symptoms. The BSI consists of 53 items that are rated on a five-point Likert type scale, ranging from 0 (not at all) to 4 (very much). The items are assigned to nine dimensions: 1) somatic complaints; 2) cognitive problems; 3) interpersonal sensitivity; 4) depression; 5) anxiety; 6) hostility; 7) phobic fear; 8) paranoid ideation, and 9) psychoticism.

Pool of items.
For this study a selection of items was made from the BSI and the MASQ. From the MASQ the 77 of 90 items which were assigned to a subscale by the authors of the MASQ (Watson & Clark, 1991) were used. The BSI subscales *paranoid ideation* and *psychoticism* were not used, because we are predominantly interested in mood and anxiety disorders and expected a high positive skewness on these items in the population we studied. Twelve items of the BSI closely resembling MASQ items were omitted, as highly collinear items should not be subjected to factor-analysis. The end result was a pool of 104 items.

Statistical analyses
All positively formulated items of the MASQ were reversed keyed before analysis. Exploratory factor analyses with oblique rotation were performed using SPSS procedure 'Factor, rotations Oblimin'. We preferred factor analysis

(FA) over principal component analysis (PCA), because we were looking for factors, uncorrelated or correlated, which explain the interrelationships between the observed variables. This approach is different from the idea of PCA in which uncorrelated components are sought which explain the most variation of the variables. Oblique rotation rather than orthogonal rotation was chosen, because substantial correlation between the factors was expected. Before factor extraction, the correlations between the items were inspected to check for items which failed to correlate 0.20 or more with any other item (Floyd & Widaman, 1995). None were found.

The number of factors to extract was determined using eigenvalues above one, a parallel analysis (Monte Carlo PCA), the screeplot, the number of unique loading items per factor, and most importantly, the interpretability of the factors. New subscales (mean score) were formed with items loading at least .40 on the factors (loadings in the pattern matrix). Before calculating the scores on the new subscales all items of the BSI were recoded from 0-4 to 1-5 to match the scores of the MASQ.

After new subscales were composed, the reliability and validity of these scales were determined. Coefficient α was used to assess the internal consistency of the scales (question a). To examine the level of distinctiveness of the new scales (question b), correlation coefficients (Pearson's R) between all scales were calculated. To determine the discriminant validity of the newly found scales, we investigated whether subscale scores could discriminate between subgroups of patients based on diagnostic information obtained with the M.I.N.I.-Plus. A stepwise discriminant function analysis was performed to investigate the ability of the new scales to discriminate between the two diagnostically purest groups: 1) patients with one or more anxiety disorder(s) but without a depression and 2) patients with a depression but without an anxiety disorder (question c).

To determine whether different anxiety disorders reveal a different symptom profile (question d), we compared the mean scores of groups of patients with different anxiety disorders (and no comorbid depression) with a multivariate analysis of variance (MANOVA). All analyses were conducted using SPSS-16.

5.3 Results

Sample description

The mean age was 39 years, (sd=13, range 18 – 82) and 936 patients (63.3%) were female. All patients (n=1479) completed the MASQ and 1449 (98%) also the BSI. The M.I.N.I.-PLUS was administered in 1434 (97%) patients. Criteria for at least one current Axis-I DSM-IV disorder were met by 1347 patients (94%) and for at least two current disorders by 947 (64%) patients: mood-, anxiety- and somatoform disorders were diagnosed in 52%, 57% and 21% of the patients respectively. Depression includes both depression (89%) and dysthymia (11%),

item	questionnaire	nr
Felt like a failure	masq	47
Felt worthless	masq	13
Felt inferior to others	masq	64
Was disappointed in myself	masq	74
Blamed myself for a lot of things	masq	24
Felt hopeless	masq	22
Felt withdrawn from other people	masq	26
Felt unattractive.	masq	53
Feeling hopeless about the future	BSI	35
Felt discouraged	masq	8
Felt pessimistic about the future	masq	42
Feeling very self-conscious with others	BSI	42
Felt dissatisfied with everything	masq	29
Felt depressed	masq	16
Felt uneasy	masq	20
Feeling lonely	BSI	16
Felt like nothing was very enjoyable	masq	33
Had trouble making decisions	masq	70
Feeling blue	BSI	17
Felt sad	masq	6
Felt like there wasn't anything interesting or fun to do	masq	44
Feeling that people are unfriendly or dislike you	BSI	21
Thought about death or suicide	masq	89
Feeling blocked in getting things done	BSI	15
Worried a lot about things	masq	84
Felt like I was having a lot of fun	masq	23
Felt optimistic	masq	18
Felt like I had a lot to look forward to	masq	40
Looked forward to things with enjoyment	masq	30
Felt really "up" or lively	masq	58
Felt like I had accomplished a lot	masq	35
Felt like I had a lot of interesting things to do	masq	36
Felt really good about myself	masq	86
Felt really happy	masq	14
Felt cheerful	masq	1
Was proud of myself	masq	49
Felt hopeful about the future	masq	78

Table 5.1 Factor structure after OBLIMIN rotation.

original scale	DM	LPA	SA	PF	HOS
GDD	**0.84**				
GDD	**0.82**				
GDD	**0.79**				
GDD	**0.77**				
GDD	**0.67**				
GDD	**0.66**				
AD (interest)	**0.63**				
AD (interest)	**0.61**				
DEP	**0.60**				
GDD	**0.60**				
GDD	**0.60**				
I-S	**0.55**				
GDM	**0.54**				
GDD	**0.51**				
GDA	**0.51**				
DEP	**0.51**				
AD (interest)	**0.49**	-0.31			
GDM	**0.49**				
DEP	**0.47**	-0.31			
GDD	**0.44**				
AD (interest)	**0.44**				
I-S	**0.43**				0.32
AD (interest)	**0.42**				
O-C	**0.41**				
GDM	**0.40**				
AD (PA)		**-0.86**			
AD (PA)		**-0.84**			
AD (PA)		**-0.82**			
AD (PA)		**-0.78**			
AD (PA)		**-0.77**			
AD (PA)		**-0.77**			
AD (PA)		**-0.75**			
AD (PA)		**-0.73**			
AD (PA)		**-0.72**			
AD (PA)		**-0.70**			
AD (PA)		**-0.68**			
AD (PA)		**-0.67**			

item	questionnaire	nr
Felt like I had a lot of energy	masq	72
Seemed to move quickly and easily	masq	27
Felt really slowed down	masq	66
Felt faint	masq	19
Was trembling or shaking	masq	79
Muscles twitched or trembled	masq	69
Felt dizzy or light-headed	masq	52
Hands were shaky	masq	57
Heart was racing or pounding	masq	75
Muscles were tense or sore	masq	81
Trouble getting your breath	BSI	29
Felt numbness or tingling in my body	masq	25
Was short of breath	masq	55
Had pain in my chest	masq	45
Had hot or cold spells	masq	48
Had trouble swallowing	masq	87
Hands were cold or sweaty	masq	88
Felt nauseous	masq	9
Feeling weak in parts of your body	BSI	37
Felt like I was choking	masq	61
Had a lump in my throat	masq	65
Had a very dry mouth	masq	67
Had an upset stomach	masq	63
Got tired or fatigued easily	masq	90
Having to avoid certain things, places, or activities because they frighten you	BSI	31
Suddenly scared for no reason	BSI	12
Spells of terror of panic	BSI	45
Feeling afraid to travel on buses, subways, or trains	BSI	28
Feeling afraid in open spaces or on the streets	BSI	8
Your feelings being easily hurt	BSI	20
Temper outburst that you could not control	BSI	13
Feeling easily annoyed or irritated	BSI	6
Getting into frequent arguments	BSI	46
Having urges to break or smash things	BSI	41
Felt irritable	masq	17
Having urges to beat, injure, or harm someone	BSI	40
Feeling tense or keyed up	BSI	38

Table 5.1 Factor structure after OBLIMIN rotation (Continued).

original scale	DM	LPA	SA	PF	HOS
AD (PA)		**-0.64**			
AD (PA)		**-0.51**			
AD (interest)	0.35		**0.48**		
AA	0.30		**0.45**	-0.32	
AA			**0.72**		
AA			**0.71**		
AA			**0.67**		
AA			**0.63**		
AA			**0.61**		
GDA			**0.60**		
SOM			**0.60**		
AA			**0.60**		
AA			**0.58**		
AA			**0.56**		
AA			**0.56**		
AA			**0.55**		
AA			**0.53**		
GDA			**0.51**		
SOM			**0.50**		
AA			**0.50**		
GDA			**0.48**		
AA			**0.47**		
GDA			**0.46**		
GDM			**0.44**	-0.37	
PHOB	0.31			**0.45**	
ANX			0.37	**0.48**	
ANX			0.35	**0.50**	
PHOB			0.30	**0.44**	
PHOB				**0.44**	
I-S	0.32				**0.49**
HOS					**0.79**
HOS					**0.76**
HOS					**0.75**
HOS					**0.72**
GDM					**0.66**
HOS					**0.60**
ANX					**0.54**

item	questionnaire	nr
Felt keyed up, “on edge”	masq	82
Felt confused	masq	4
Felt sluggish or tired	masq	56
Feeling uneasy in crowds, such as shopping or at a movie	BSI	43
Feeling no interest in things	BSI	18
Felt really bored	masq	21
Had trouble paying attention	masq	80
Felt like something awful was going to happen	masq	34
Felt like it took extra effort to get started	masq	39
Felt afraid	masq	2
Slept very well	masq	5
Was afraid I was going to die	masq	73
Startled easily	masq	3
Nervousness or shakiness inside	BSI	1
Felt nervous	masq	15
Felt very restless	masq	50
Had to urinate frequently	masq	85
Feeling nervous when you are left alone	BSI	47
Had trouble concentrating	masq	76
Feeling so restless you couldn’t sit still	BSI	49
Having to check and double-check what you do	BSI	26
Had diarrhea	masq	12
Had trouble remembering things	masq	31
Your mind going blank	BSI	32
Did not have much of an appetite	masq	37
Was unable to relax	masq	59
Had trouble falling asleep	masq	51
Had trouble staying asleep	masq	83
Felt like crying	masq	10
Felt tense or “high-strung”	masq	77

Note:
Original scales: MASQ: AA = anxious arousal, AD = anhedonic depression, GDD = general distress depression, GDA = general distress anxiety, GDM = general distress mixed. BSI: SOM = Somatization, O-C = Obsessive-Compulsive, I-S = Interpersonal Sensitivity, DEP = Depression, ANX = Anxiety, HOS = Hostility, PHOB = Phobic Anxiety.

Table 5.1 Factor structure after OBLIMIN rotation (Continued).

original scale	DM	LPA	SA	PF	HOS
GDA					**0.51**
GDM	0.39				
GDD	0.38		0.36	-0.36	
PHOB	0.38			0.35	
DEP	0.37	-0.30			
AD (interest)	0.37				
GDM	0.33			-0.31	
GDM	0.31		0.32		
AD (interest)	0.30		0.36	-0.35	
GDA	0.30			0.39	
GDM		-0.35			
AA			0.39		
AA			0.38		
ANX			0.37		
GDA			0.31		
GDM			0.31		
AA			0.30		
PHOB				0.32	
GDM				-0.31	
ANX					0.36
O-C					0.35
GDA					
GDM					
O-C					
GDM					
GDA					
GDM					
GDM					
GDD					
GDA					

New scales: DM = depressed mood, LPA = low positive affect, SA = somatic arousal, PF = phobic fear, HOS = hostility.

but not bipolar disorder. The comorbidity between anxiety and depression was high: 30.1% of the patients had a depression as well as an anxiety disorder. The percentage of patients with one or more anxiety disorder(s) and no depression was 26.8 and the percentage of patients with a depression and no anxiety disorder was 21.5. The remaining group of patients (21.5%) had no anxiety or depression diagnoses and consisted of patients with a somatoform disorder or an adjustment disorder or no current disorder (6%) according to M.I.N.I.-Plus.

Factor Analysis

The 104 items were subjected to an exploratory factor analysis using the data of patients who completed the MASQ and BSI (n=1449). Parallel analysis suggested retaining 10 factors. Sixteen factors had an eigenvalue > 1 and the eigenvalues of the first 6 factors were: 33.8, 6.6, 4.4, 3.0, 2.5 and 2.0. The screeplot of the factor solution flattened out starting from the fifth or sixth component, suggesting that a four or five-factor solution would best fit the data (Catell, 1966). Rotated factor solutions (oblimin rotation) were calculated for three, four-, and five-factor solutions. The three factor solution resembled the tripartite model and explained 43% of the variance. Most items with uniquely loadings, loaded on the first factor (e.g. sad, angry, low self-esteem, guilty, unattractive, and worrying). The second factor contained all the positively skewed items (PA), and only items with explicit physical symptoms loaded uniquely on the third factor. The four factor solution (explaining 46% of the variance) resembled the three factor solution supplemented with a factor with only one item with a unique loading ("Having to avoid certain things, places, or activities because they frighten you" (BSI item 31)). In the five-factor solution no items had a loading higher than .399 on more than one factor (see Table 5.1) making this solution easier to interpret. Thus, a five-factor solution was chosen. The five-factor solution accounted for 48% of the total variance in the scores. The first factor loads mainly on items originally belonging to two subscales of the MASQ: general distress depression and the negative endpoint of anhedonic depression: loss of interest. The second factor represents the positive endpoint of the MASQ subscale anhedonic depression: positive affect. The items loading high on the third factor are mainly items about somatic symptoms of anxiety. The fourth factor is a combination of items of the BSI subscales anxiety and phobic anxiety. The fifth factor comprises predominantly items from the BSI subscale hostility. When comparing our five factors with the five scales of the MASQ, the scales anhedonic depression (low positive affect) and anxious arousal are retained. Three new scales emerged: depressed mood, phobic fear and hostility.

Subsequently, five scales were composed by calculating the mean of the items with loadings of at least .40 (the items in bold typeface in Table 5.1): depressed mood (DM; factor I), low positive affect (LPA, factor II), somatic arousal (SA;

	DM	LPA	SA	PF	HOS
DM (26 items)	(α= .96)	.64	.57	.48	.68
LPA (14 items)		(α= .94)	.41	.26	.39
SA (23 items)			(α= .93)	.54	.54
PF (5 items)				(α= .85)	.45
HOS (9 items)					(α=.89)

Note:
New scales: DM=depressed mood, LPA=low positive affect, SA=somatic arousal, PF=phobic fear, HOS=hostility. All correlations are significant at the 0.01 level.

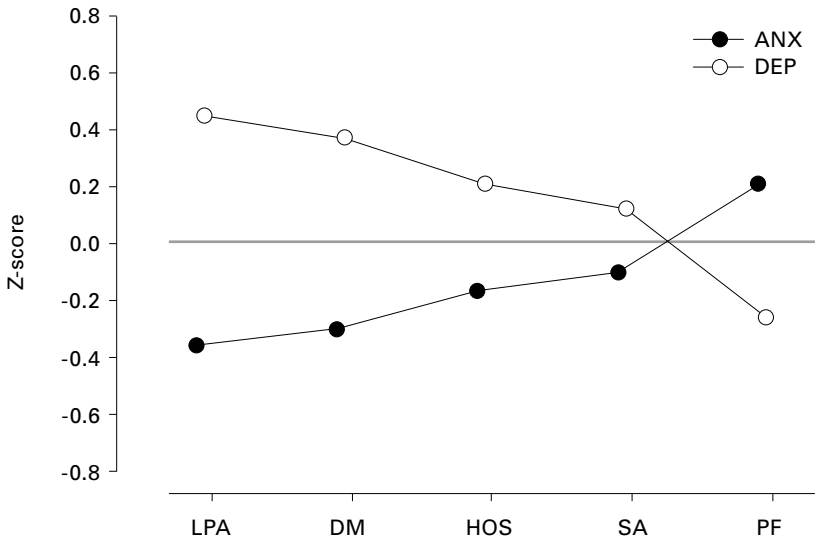
Table 5.2 Correlation & Cronbach's alpha among newfound scales.

	AD	AA	GDD	GDA	GDM
AD	(α= .94)	.50	.79	.61	.76
AA		(α= .90)	.54	.76	.66
GDD			(α= .92)	.71	.79
GDA				(α= .85)	.77
GDM					(α= .89)

Note:
Original scales: MASQ: AD=anhedonic depression, AA=anxious arousal, GDD=general distress depression, GDA=general distress anxiety, GDM=general distress mixed. All correlations are significant at the 0.01 level.

Table 5.3 Correlation & Cronbach's alpha among original MASQ scales.

factor III), phobic fear (PF; factor IV) and hostility (HOS; factor V). Although one of the scales (PF) consists of only five items, the internal consistency (reliability) of all the scales is high, ranging between α=.85 and α=.96 (depicted on the diagonal in Table 5.2). Furthermore, the new scales appear sufficiently distinct: The correlations among the new scales (Table 5.2) range from .26 to .68, while those among the original scales of the MASQ (Table 5.3) range from .50 to .79. Especially low is the correlation between *low positive affect* and *phobic fear*: r=.26, suggesting that these scales may differentiate well between depression and anxiety disorders.



Note:
New scales: LPA=low positive affect, DM=depressed mood, HOS=hostility SA=somatic arousal, PF=phobic fear, ANX= patients with one or more anxiety disorder(s) and no mood disorder, DEP= patients with a mood disorder and no anxiety disorder.

Figure 5.1 Symptom profiles (mean z-scores) for patients with a singular depression (n=309) and for patients with a singular anxiety disorder (n=385).

Discriminant analysis

To determine the discriminant validity of the new scales, we made two groups of patients: 1) patients with one or more anxiety disorder(s) without a comorbid depression (ANX) and 2) patients with a depression without a comorbid anxiety disorder (DEP). Because the discriminant validity of the scales is best tested in a comparison of pure anxiety with pure depression, we did not include patients with comorbid anxiety disorder and depression in this analysis. With excluding this group, we also limited the influence of the severity of psychopathology. A stepwise discriminant function analysis was performed to investigate the ability of the five new scales to discriminate between these two diagnostically purest groups. The analysis resulted in a model ($\chi^2(3)=215$, $p\leq.001$) based on three of the five scales: low positive affect, depressed mood and phobic fear. Low positive affect and phobic fear are the best discriminators between depressed patients and patients with an anxiety disorder. Patients with a high score on

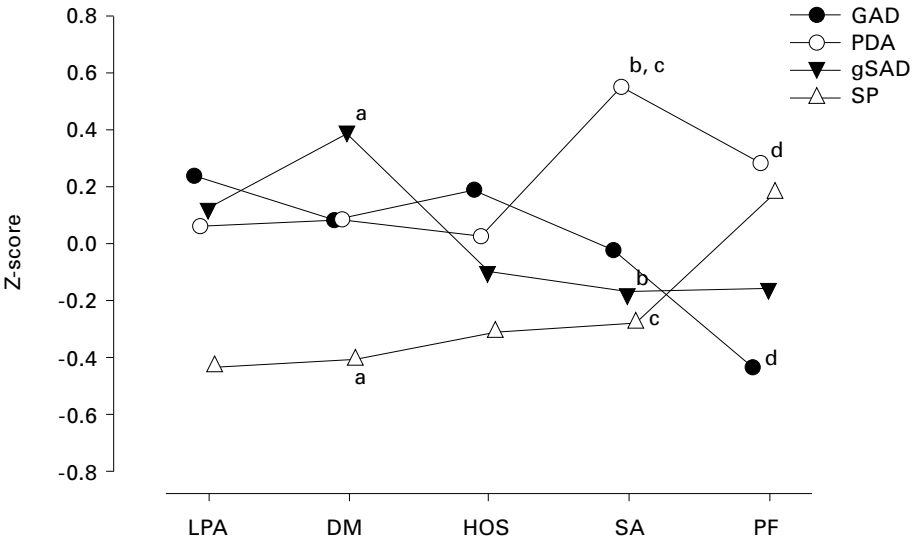
low positive affect are more likely to belong to the group with depression (mean score DEP=4.36, SD=.64 versus mean score ANX=3.70, SD=.82) and patients with a high score on *phobic fear* are more likely to belong to the group with an anxiety disorder (mean score DEP=0.60, SD=.73 versus mean score ANX=1.00, SD=.92). With this model 75% of the patients with an anxiety disorder and 71% of the patients with a depression were classified correctly. When analysed with the original MASQ these percentages are 77% and 69%, respectively. However, with the original MASQ none of the scales in the discriminant function reveal a high score specific for anxious patients: depressed patients score higher on all original MASQ-scales in the discriminant function than anxious patients.

To illustrate the discriminant value of each new scale, the results of the two groups in the discriminant analysis (patient with a depression and no anxiety disorder, and patients with an anxiety disorder and no depression) on the five scales are shown on Fig. 5.1. To make comparisons between the scales easier, we standardized scores for the five new subscales (z-scores). The figure shows that both groups have a specific profile.

If scales are specific for either depression or anxiety, one also expects that patients with the specific disorder score higher on the scale than patients without any mood or anxiety disorder (NO ANX/DEP). We tested this with two t-tests on the new scales specific for anxiety (PF) and specific for depression (LPA). As expected, patients with a depression had a higher score on LPA than patients without a mood or anxiety disorder (mean score DEP=4.36, SD=.64 versus mean score NO ANX/DEP=3.60, SD=.79, p=.000) and patients with an anxiety disorder had a higher score on PF than patients without a mood or anxiety disorder (mean score ANX=1.00, SD=.92 versus mean score NO ANX/DEP=0.37, SD=.55, p=.000).

Multivariate analysis of variance

To further examine the discriminant validity of the new found scales, we compared the scores of four groups of patients with a specific anxiety disorder. For this analysis, we only selected patients with a singular anxiety disorder (no comorbid depression and no more than one anxiety disorder). Because of the high comorbidity in our sample, this resulted in relatively small groups of patients with singular anxiety disorders: general anxiety disorder (GAD; n=32), panic disorder (PDA; n=28), simple phobia (SP; n=20) or generalized social anxiety disorder (gSAD; n=47). The mean z-scores of these four groups of patients are shown on Fig. 5.2. The figure clearly shows that patients with panic disorder have a higher score on somatic arousal than patients with any of the other anxiety disorders. Differences between the groups were tested with a multivariate analysis of variance (MANOVA). Main effects were found on *somatic arousal*, *phobic fear* and *depressed mood* (SA ($F(3)=4.4$, $p\leq.006$), PF ($F(3)=3.5$, $p\leq.019$) and DM ($F(3)=3.1$ $p\leq.029$)). Post-hoc analyses (Tukey)



Note:
New scales: LPA=low positive affect, DM=depressed mood, HOS=hostility SA=somatic arousal, PF=phobic fear, PDA=panic disorder, GAD=generalized anxiety disorder, gSAD=generalized social anxiety disorder, SP=simple phobia. Corresponding letters (a, b, c, d) refer to significant difference according to the post-hoc analyses (Tukey).

Figure 5.2 Symptom profiles (mean z-scores) for four specific anxiety disorders without a mood disorder: Panic disorder (n=28), generalized anxiety disorder (n=32), simple phobia (n=20) and generalized social anxiety disorder (n=47).

showed that the panic disorder group had higher scores than the GAD and the gSAD patients on *somatic anxiety* (SA; PDA>GAD/gSAD). Patients with a panic disorder revealed a higher score on *phobic fear* than GAD patients (PF; PDA>GAD). On the scale *depressed mood* patients with gSAD had a higher score than patients with a simple phobia (DM; gSAD>SP).

5.4 Discussion

The aim of the present study was to develop scales that can adequately differentiate between depression and anxiety disorders, and also can distinguish within the anxiety disorders. The scales are based on a pool of items from the MASQ supplemented with BSI items. Factor-analysis resulted in a solution with

five factors. The requirement of distinctness of the new scales was largely met: the correlations between the scales based on this factor solution were relatively low and the internal consistency of the scales was good. The intercorrelation of two scales, *phobic fear* and *low positive affect,* was even very modest (r=.26). In addition, the scales were able to differentiate rather well between patients with a mood and patients with an anxiety disorder. As compared to the original MASQ, the percentages correctly classified patients are highly similar. However, similar to a previous study in a clinical sample (Buckby et al., 2007), we found that depressed patients score higher on all original MASQ-scales in the discriminant function than anxious patients. The discriminant validity of the new scales was considerably better, as patients with an anxiety disorder scored significantly higher on one of the scales (PF) than patients with a depression.

Mineka, Watson and Clark (Mineka et al., 1998) suggested the use of a model in which each individual syndrome contains both a common and a unique component: the integrative hierarchical model. The scales we found fit well in this model. Patients with only an anxiety disorder (except patients with GAD) are predominantly characterized by a heightened score on *phobic fear* whereas depressed patients show high scores on the *low positive affect* and *depressed mood* scales. Furthermore, each of the four included anxiety disorders had a different profile on the five new scales. Comparing the mean scores on the new scales between patients with one of four anxiety disorders (gSAD, GAD, SP and PDA), the scale *somatic arousal* appeared to be specific for patients with panic disorder. This is consistent with the findings of several previous studies (Chorpita, 2002; De Beurs et al., 2007; Keogh & Reidy, 2000). The phenomenology of anxiety disorders is better represented with *phobic fear* next to *somatic arousal*.

The scale *hostility* did not contribute to the discriminant function. A possible explanation can lie in the recent discovery that irritability within a depression, is associated with greater overall severity, anxiety comorbidity and suicidality (Perlis et al., 2009) and therefore not specific for depression nor anxiety. However, hostility is clinical relevant and underestimated in our current classification systems (Pasquini et al., 2004; Picardi et al., 2004) and can therefore be a valuable feature to assess.

Our findings are in line with the structure underlying mood and anxiety disorders that was recently presented by Watson (Watson, 2005). For the DSM-5, Watson has suggested to use a quantitative hierarchical model in which the mood and anxiety disorders are taken together to form an overarching class of emotional disorders with 3 subclasses (distress disorders, fear disorders and bipolar disorders). Our finding that patients with GAD, just like patients with a depression do not have a high score on the two 'anxiety-like dimensions' PF and SA, is in line with the suggestion of Watson to classify GAD as a distress disorder rather than as a fear disorder.

In the present study, the content validity of the new scales was investigated by comparing scores of patients with singular disorders. Of course, such an approach is not a definite test of the validity of the proposed scales for psychopathology of depression and anxiety disorders, given the inherent limitations of diagnostic categorization by itself and the resulting overlap in the phenomenology of depression and anxiety disorders. In future research the content validity should also be evaluated in other ways as well, for instance by demonstrating a distinct predictive value of dimensions for the course of complaints over time or a prognostic value for treatment effect.

Strength of the study is the large patient sample, mainly consisting of patients with the relevant disorders: depression and anxiety disorders. We choose to limit the analyses of the discriminant validity to only those patients with a pure depressive or anxiety disorder. This was feasible given the large number of patients included in the study. An important advantage of this approach is the diminished role of severity in the analysis.

A limitation of the findings regarding the factor structure is that the subscale *low positive affect* is only composed of positively formulated items (e.g. "I felt cheerful"). The assumption of the tripartite model that the dimension positive affect comprises two extremes (lack of interest and feeling good) is thus not confirmed by our results. This finding is consistent with earlier studies that showed lack of interest as belonging to negative affect (De Beurs et al., 2007; Keogh & Reidy, 2000; Watson et al., 1995). However, the fact that all positively formulated items load predominantly on a single factor suggests a method effect, rather than the presence of a conceptually distinct construct.

In sum, we present a five factor model as an extension of the tripartite model. Through the addition of phobic fear, anxiety is better represented than in the tripartite model. The new scales are capable to accurately differentiate between depression and anxiety disorders, as well as between several anxiety disorders.